



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

U.A

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/529,808	12/15/2005	Peter John Seebacher	2005-PCT-1	8363
7590 Martin E Hsia PO Box 939 Honolulu, HI 96808			EXAMINER VAUGHN, MEGANN E	
			ART UNIT 2859	PAPER NUMBER
			MAIL DATE 05/03/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/529,808	Applicant(s) SEEBACHER ET AL.	
	Examiner Megann E. Vaughn	Art Unit 2859	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 March 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 13-15 is/are rejected.
- 7) ☒ Claim(s) 7-12 and 16-18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claims 7-12, and 16-18 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from any other multiple dependent claim. See MPEP § 608.01(n). **Accordingly, the claims have not been further treated on the merits.**

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 2, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sai (US 5765948) in view of Wada (US 5217306).

Regarding claim 1, Sai discloses in figure 2 a temperature sensing method in which pulses of optical radiation (column 8, lines 41-43) are launched by a laser (4) into an optical fibre (3) and optical radiation backscattered from the fibre is detected (column 8, lines 55-57), the method comprising passing the backscattered radiation through a single optical filter (6) (column 8, lines 58-60) whereby a first signal is recorded at the anti-Stokes Raman wavelength from a signal launched by the laser in a laser mode and a second signal is recorded at the Rayleigh wavelength from a signal launched by the

Art Unit: 2859

laser (column 8, line 66- column 9, line 20), and a comparison is made of the two signals to provide an indication of temperature (column 10, lines 12-20).

Regarding claim 13, Sai discloses in figure 2 a distributed temperature sensor comprising a laser (4) adapted to launch pulses of optical radiation (column 8, lines 41-43) into an optical fibre (3) arranged to be located in thermal contact with an object (1) (column 8, lines 33-34), and a single optical filter (6) to detect optical radiation backscattered from the fibre (column 8, lines 58-60).

Regarding claims 1 and 13, Sai does not disclose that the laser is a laser diode.

Wada discloses a temperature distribution analyzer using an optical fibre wherein a laser diode is used to generate pulsed light (column 3, lines 18-20). Therefore it would have been obvious to a person having ordinary skill in the art at the time that the invention was made to use a laser diode as taught by Wada as the light source disclosed by Sai in order to provide a high intensity light at high efficiency for more accurate temperature measurement results.

Regarding claim 2, Sai discloses that the comparison produces the quotient of the anti-Stokes Raman wavelength divided by the Rayleigh wavelength (column 6, lines 60-61).

4. Claims 3 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sai (US 5765948) in view of Wada (US 5217306) as applied to claims 1, 2, and 13 above, and further in view of Alsmeyer et al (US 5638172).

Regarding claims 3 and 14, Sai and Wada disclose the temperature sensing method as stated above in paragraph 3. Sai and Wada do not disclose a photomultiplier tube to count photons passing through the single optical filter.

Alsmeyer et al discloses that a common method of observing photons is with a photomultiplier tube (column 7, lines 4-8). Therefore it would have been obvious to a person having ordinary skill in the art at the time that the invention was made to utilize a photomultiplier tube as taught by Alsmeyer as the photodetector disclosed by Sai in order to ensure that the apparatus is capable of measuring low levels of radiation to accurately count photons passing through the optical filter.

5. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sai (US 5765948) in view of Wada (US 5217306) in view of Alsmeyer et al (US 5820265) as applied to claims 3 and 14 above, and further in view of Kleinerman (US 5820265).

Regarding claim 4, Sai, Wada, and Alsmeyer et al disclose the temperature sensing method according to claim 3 as state above in paragraph 4. Sai, Wada, and Alsmeyer et al do not disclose that the arrival time of the signals allows identification of the position of that temperature along the length of the optical fibre cable.

Kleinerman discloses an optical system for sensing temperature and thermal infrared radiation wherein the time of the arrival of the signals allows identification of the position of that temperature along the length of the optical cable (column 7, lines 2-6). Therefore it would have been obvious to a person having ordinary skill in the art at the time that the invention was made to use the time of arrival of the signals at the

Art Unit: 2859

photodetector/photomultiplier tube disclosed by Sai, Wada, and Alsmeyer et al to identify the position of the sensed temperature along the length of an optical cable as taught by Kleinerman in order to sense multiple temperatures at different points along an optical cable.

6. Claims 5, 6, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sai (US 5765948) in view of Wada (US 5217306) in view of Alsmeyer et al (US 5820265) in view of Kleinerman (US 5820265) as applied to claim 4 above, and further in view of Ozawa et al (US 5113277).

Regarding claims 5, 6 and 15, Sai, Wada, Alsmeyer et al, and Kleinerman disclose the temperature sensing method according to claim 4 wherein the laser diode, optical filter, and photomultiplier tube are couples to the optical fibre via connectors (see Sai figure 2) as stated above in paragraph 5. Sai, Wada, Alsmeyer et al, and Kleinerman do not disclose at least one temperature sensor positioned downstream of the connectors to correct error signals emanating from the connectors.

Ozawa et al discloses a fiber optic distributed temperature sensor system wherein a thermistor or thermocouple is used to measure the temperature of the measuring system. Therefore it would have been obvious to a person having ordinary skill in the art at the time that the invention was made to use a thermistor or thermocouple as taught by Ozawa et al to observe the temperature of the system and potential errors along the connectors disclosed by Sai, Wada, Alsmeyer et al, and Kleinerman in order to prevent any connectors from overheating which could damage the sensor system and/or cause errors in the results.

Conclusion

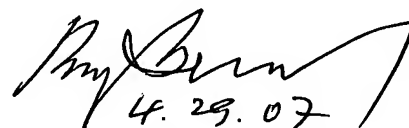
7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: **Fredin et al (US 2003/0021528), Hartog (US 5592282), Hartog et al (US 4823166), and Ozawa et al (US 5113277).**

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Megann E. Vaughn whose telephone number is 571-272-8927. The examiner can normally be reached on 8 am- 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on 571-272-2245. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MEV
Patent Examiner Art Unit 2859
4/25/2007



4. 25. 07

**BRIJ SHRIVASTAV
PRIMARY EXAMINER**